

II. *Butterfly-destroyers in Southern China.* By JOHN C.  
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PERHAPS the creatures which in this district destroy or injure the largest number of butterfly imagines are lizards, particularly one species (*Calotes versicolor*, Daud.), which climbs up into the clumps of *Lantana camara*, a profusely flowering plant or shrub which grows here on most waste ground. Probably the greater part of their prey consists of *Hesperiidae*, three or four species of which haunt the flowers of the *Lantana* in immense numbers. Other reptile foes to butterflies are probably the tree-frogs, and possibly the very numerous small snakes which are always climbing in the tops of the bushes.

Spiders' webs account for some mishaps to butterflies, but they are not invariably eaten; at other times species which are reckoned most distasteful as food of other animals are seized and eaten at once, according, I suppose, as the owner of the web is hungry or otherwise. I have seen our large black-and-yellow spider (*Epeira maculata* of Donovan's "Insects of China") eating *Euplœa amymone*, Godt., caught in his web. He had attacked and considerably injured the lower side of the abdomen and part of the thorax; but when I took the butterfly from him, examining it laid flat in my hand, the insect suddenly flew up to the top of a large banyan tree, where it settled. One would hardly imagine even a *Euplœa* would have much life in it after being so badly mauled. The same spider I have seen eating *Papilio dissimilis*, L. (= *clytia*, L., = *panope*, L.), the black-and-yellow form. Also at different times *Neptis eurynome*, L., and *Euplœa midamus*, L., but on the whole it is not common to see a butterfly in a spider's web. I might mention that I saw this spider devouring a small bat, about eight inches across the wings, caught overnight in his web.

There is also here a small but thickset white spider which usually conceals itself in white flowers, and which

I have two or three times seen capture the little black-and-yellow Skipper, *Telicota bambusæ*, Moore, by the head.

The large green Mantis, *Hierodula saussureii*, W. F. Kirby, our commonest species, apparently catches anything he can get hold of. I have kept Mantidæ and fed them with many species of butterflies, none of which they refused, but data obtained from creatures in captivity are not, I think, very reliable, as under these circumstances they often take food which in a natural state they would probably reject. But I have seen this Mantis in the open on a shrub, eating the two species of *Euplexa* before mentioned. He is a very bold insect, and, even in a wild state, seldom refuses any butterfly offered to him.

One of the worst enemies of the *Hesperiidæ* is a large hairy species of (Asilid ?) fly, which seizes them and drives its proboscis into the thorax. Either it is very fearless or it cannot easily disengage its weapon from its prey, for I have often kept stirring one up with a stick, when it would merely fly to another leaf close by, still holding its victim. These flies also kill a moderate-sized Cicada in great numbers.

In the last two months (August and September) I have three times seen butterflies seized by the tongue by ants, as they probed a flower. On one occasion an ant seized *Neptis eurynome* by the tip of the tongue, and the butterfly immediately flew away with the ant hanging on it. About half-an-hour afterwards I captured the *Neptis* with the ant still clinging to its tongue. The other instances were both *Telicota bambusæ*, and each was caught by the tip of the tongue by an ant.

I should be inclined to think that the birds here account for very few imagines, comparatively speaking, whatever they may do in the larva and pupa line. The only birds I have seen attack butterflies, and generally miss them, are sparrows (our common sparrow is *Passer montanus*), the green Bulbul, *Pycnonotus sinensis*, the black Drongo, *Buchanga atra* and the Paradise-flycatcher, *Terpsiphone princeps*. During five years I have, perhaps, seen a dozen attacks on butterflies by birds, and only seen them captured two or three times. Speaking from my own limited experience I should say imagines here have few enemies, and that those few inflict very slight damage. Unfavourable climatic conditions seem to be most inimical to them. (Cf. Trans. Ent. Soc. 1895, pp. 437-8.)

But in the egg, larva and pupa state, butterflies here have a host of enemies, the eggs especially being destroyed by ants, which also attack and carry off young larvæ and pupæ. Ants almost certainly account for the greater part of casualties amongst eggs, because of their being ubiquitous and in countless swarms. One small orange plant, which I often examined many consecutive mornings, was much frequented by ♀♀ of *Papilio polytes*, L., and *P. helenus*, L., also *P. sarpedon*, L. I have frequently seen the ♀ lay an egg and fly off, and a moment after an ant, waiting below the leaf, would carry the egg away. Sometimes I have noticed a particular leaf and stem with three or four eggs close together on them, and returning an hour or so later have found them gone, almost certainly taken by the ants which were invariably climbing over the plant.

Centipedes kill pupæ, twining round them, boring a tiny hole, and appearing to suck out the contents.

Some of the Hemiptera or "bugs" (*Capsidæ*, I think) probably account for the destruction of some pupæ, as I have seen one with its trunk driven into a chrysalis, and two or three times have seen a small red-and-black bug, about an inch long, force its proboscis through the thin shell of a small snail and eat or suck out the inmate.

Amongst birds the Cuckoos especially must destroy very great numbers of butterfly larvæ during their short summer stay here, *Cuculus micropterus* probably inflicting most damage. The Cuckoo, like the Mantis, will eat almost anything, and if a larva is particularly hairy it rubs it up and down on the ground or tree trunk till it breaks off most of the hair. It seems very fond of the larvæ of *Rhopalocampta benjamini*, Guer., a bright yellow-and-black larva with a red head, and during May and June its stomach generally contains several, judging from those shot. Wasps, of course, carry off many larvæ, but chiefly, I think, those of the *Pieridæ*, which are usually fairly smooth-skinned. I was rearing a lot of *Catopsilia pyranthe* larvæ on the roof of the house, on a *Cassia* plant, and the wasps carried off so many I was obliged to cover them up. The ants, too, killed many of the newly-hatched larvæ, and as soon as pupating began, started carrying off the pupæ.

Ichneumonidæ I pass over, all kinds of larvæ in all parts of the world being presumably attacked by them, but some of the *Pieridæ* here seem especially subject to

their attacks. Of about a score pupæ of *Delias aglaia*, L., found on a shrub, three produced butterflies, the rest ichneumons. Of the same number of young larvæ reared, all fed well till about half-grown, then all but six dwindled away to mummies, two died when full-grown; the rest pupated, but only two butterflies appeared, the other pupæ shrivelling up. They were supplied with fresh food every day, and till half-grown appeared very healthy. There seem to be special checks on the increase of some species of *Pieridæ*.

No doubt the injuries done to the wings of butterflies are often the result of attacks by various enemies, but I think the greater part are caused by the insects themselves flying through thick cover, where one may often distinctly hear and see the wings of a *Papilio* strike leaves and twigs; or by getting into and escaping from the numerous spiders' webs, and threads stretched from tree to tree; or by simple stress of weather. Several times I have seen what I took, at first sight, to be a new species of *Papilio* which when taken proved to be either *P. polytes* or *P. dissimilis* with the hind-wings covered with the red or yellow pollen of flowers, generally the large flowering tree *Bombax ceiba*. These specimens invariably had the wings torn, and as the pollen is sticky it probably was partly the cause of various rents and ragged margins.

One often sees a *Papilio*, generally either *P. agamemnon*, L., or *P. sarpedon*, which haunts a certain locality or "beat" for days together, flying at a good height and seldom settling; these "solitaries" chase away other butterflies and even dragon-flies, and I have seen *Euplainæ* and *Neptis* chase dragon-flies, which swarm here. Of all insect foes I should have thought that dragon-flies, from their very swift flight and powerful jaws, would have been most dangerous to butterflies, but I have never seen one attack a butterfly, though they sometimes kill and eat each other.

My few notes would, in short, point to butterflies which have escaped the sundry and manifold dangers of the egg, larva and pupa stages having collectively, comparatively little to fear in the perfect state.